

OPERATIVE PROCEDURES IN CONGENITAL AND  
TRAUMATIC DISLOCATIONS OF THE  
HIP IN CHILDREN.<sup>1</sup>

By V. P. GIBNEY, M.D.,

OF NEW YORK,

SURGEON-IN-CHIEF TO THE HOSPITAL FOR THE RUPTURED AND CRIPPLED.

THIS paper is based upon the results in nine cases of operation for dislocation of the hip in children, five of which were performed for the relief of congenital dislocation. The remaining four presented the same deformity, but in all of these, with one exception, the head of the bone had been destroyed by previous acute inflammatory process. It has occurred to me that an analysis of these cases with the salient points in their history brought out in moderate detail would prove sufficiently interesting to serve as a study.

During the last five or six years wonderful advance has been made in the treatment of congenital dislocation of the hip, but the results in this country have not been as good as those reported from the clinics of Hoffa and Lorenz. The operation first proposed and executed by Hoffa has been improved (?) upon by Lorenz, of Vienna, and still later by Bradford, of Boston. It seems that we must admit that a proper selection of cases has not been made. The temptation to operate upon children beyond the proper age is so great that one can hardly resist. The reasons given by Hoffa are adequate enough, and these become very apparent when one attempts the operation. It is claimed by this surgeon that, in young children under four years of age, the muscles and tendons can be stretched a good deal by manual force, and that the head of the bone can be quite easily brought

<sup>1</sup> Read before the New York Surgical Society, October 10, 1894.

down into the old position. A knowledge of the deeper structures about the hip-joint, which structures include ligaments of varying density, tendons, and muscles, together with a dense tissue filling the acetabulum, would seem to impress the surgeon with the difficulties attending a successful operation. In a paper presented by Dr. Bradford at the last meeting of the American Orthopædic Association, greater importance was given to the Y ligament. This gentleman demonstrated how easy it was to divide this ligament in the anterior incision of Lorenz, and it is believed that many of the difficulties will be overcome in older cases.

By way of illustration, the following cases are given in detail :

CASE I. *Traumatic ; Operation with Good Immediate Result a Few Weeks Later ; Relapse within Two Months ; Second Operation ; Paralysis of the Thigh Muscles ; Good Recovery.*—A male, eight years of age, was admitted May 5, 1893. In November, 1892, he met with an accident. His left hip was dislocated. Was taken to Mount Sinai Hospital a few weeks afterwards, and a successful operation performed. The head of the bone slipped out of place again, about two months after the operation, and at this time the muscles of the thigh and foot were found almost completely palsied. There were one and a half inches shortening as measured from the anterior superior spinous processes, one and a half inches from the umbilicus. The thigh was one inch smaller than its fellow. The trochanter was far above Nélaton's line.

Through the extensive cicatrices of the former operation an incision was made May 19. Head found on the dorsum. The acetabulum was filled with granular and fibrinous tissue, which was removed with a sharp spoon. Acetabulum much enlarged, adductors divided, tensor vaginae femoris divided, then by great force the head of the bone was placed in the acetabulum thus prepared. The capsule was united by a kangaroo tendon, superficial wound was nearly closed with catgut, the lower portion being left open for drainage. Limb was put up in 20° abduction, plaster of Paris as a fixed dressing.

The suppuration continued throughout the spring and well into the summer. By October 1 all sinuses were closed. The limb was in good position ; no shortening. From that time to the present the

treatment has been directed to his paralyzed muscles, most of which have recovered. He still has a little foot-drop.

This case has been presented at the Surgical Section of the Academy of Medicine, and has also been before this Society prior to the second operation, and my only apology for presenting it now is as a supplement to the other cases. He presents now little or no shortening, a fair range of motion, a pretty firm cicatrix about the head of the femur, which prevents its slipping out of place. There is a little drop-toe due to paralysis of the anterior tibials.

Examination now, October 10, shows limbs equal in length both from the anterior superior spinous process and from the umbilicus. Thighs equal in size, the knee nearly one-half inch larger than the right, the calf three-quarters of an inch smaller. The angle of greatest extension is  $165^{\circ}$ . Hip is pretty stiff. Drop foot left side. The trochanter major is below Nélaton's line. He is fitted with a brace to correct his drop foot. There is no paralysis of the thigh muscles.

CASE II. *Traumatic; Hoffa's Operation; Impossible to Reduce; Half of the Head Excised, the Remainder Replaced in the Acetabulum; Prolonged Suppuration; Good Final Result.*—Male, eight years of age, was admitted April 14, 1894. In November, 1893, a larger boy fell upon him and broke his thigh near the hip, so reported. The report was also that his patella had been fractured. A surgeon put the parts in plaster of Paris. He remained two months, recovering from the fractured patella, but the hip was found to be dislocated on the dorsum. His general condition on admission was good, but he stood bearing his weight on the toe and ball of the foot, the foot rotated outward, the thigh in adduction. The tip of the trochanter was one and a half inches above Nélaton's line. The adduction was so great that the thigh lay across its fellow just above the knee. The measurements from the anterior superior spinous processes showed three-quarters of an inch shortening; from the umbilicus, three-quarters of an inch. Flexion was limited to  $90^{\circ}$ , extension to  $165^{\circ}$ .

A small curved incision was made April 18 over the head and trochanter, the capsule exposed, and an attempt was made to reduce the deformity. This was unsuccessful even after the acetabulum had been cleaned of all foreign material, after the adductors had been divided and a large portion of the capsule cut away. Finally, half of the head was excised, and it was not until this was done that the remaining portion of the head could be replaced. An attempt was

made to close primarily, but suppuration followed. The efforts at reduction, the various assistants called upon to assist in getting the head into place caused, I am sure, infection, and to this suppuration was undoubtedly due.

It was necessary after a few days to make a counter opening. One or two abscesses formed, but all the while the good position of the limb was maintained. On August 1 there was one-half inch shortening. By the use of a long Thomas splint, with a firm bandage about the hip, this shortening was reduced, so that by September 10 the limbs were equal in length.

At the last examination, which was on September 10, there was a very fair range of motion. One sinus remained open, requiring to be dressed once or twice a week. The hip was firm. With a great deal of force the head of the bone could not be thrown out. It was deemed prudent to continue the apparatus, but his parents fancied that the result was not good, and the father, while under the influence of liquor, removed the boy, and I am unable to show him this evening.

CASE III. *Congenital; Hoffa's Operation; Reduction very Difficult; Prolonged Suppuration; Good Result; a Sinus Remaining.*—Female, nine years of age, was admitted to the hospital February 23, 1894. She had been under observation in the Out-Patient Department since she began to walk, when the deformity was first discovered. The left hip was the one involved, and the patient had been subjected to the usual expectant treatment,—viz., a high shoe, sometimes a spica bandage. At the time of her admission her general condition was very good, but she bore her weight on the right limb. There was apparently two inches shortening. The trochanter major was very prominent; the ilio-femoral crease well marked. The movements were all good except in abduction. The head of the femur could be distinctly felt on the dorsum ilii. The tip of the trochanter was an inch above Nélaton's line. The comparative measurements were as follows: From the anterior superior spinous process to the lower border of the internal malleolus, right side, 25 inches; left side, 23; from the umbilicus to the malleolus, right side,  $26\frac{1}{2}$ ; left side, 25; circumference of the right thigh,  $12\frac{1}{2}$ ; left thigh,  $10\frac{1}{2}$ ; right knee,  $9\frac{1}{2}$ ; left knee, 9; right calf, 9; left calf,  $8\frac{1}{2}$ . Her gait was very awkward, but comparatively easy.

On March 6 the usual posterior incision of Hoffa was made, the capsule soon exposed, this incised when the head, neck, and trochanter were exposed. The muscles around the base of the trochanter

major and the trochanter minor were divided, and attempt made to do this as nearly subperiosteally as possible, the adductors of the thigh divided, some points of the tensor vaginæ femoris and of the fascia lata also divided. With a sharp spoon the shallow acetabulum was deepened, care being taken to preserve the rim in the upper portion. It required a great deal of scraping and shaping to get the acetabulum large enough for the head, which was finally, with considerable force, replaced. The capsule was sewn together with silkworm gut, and the wound packed with iodoform gauze. The child was put in the wood cuirass which Hoffa uses, and is known as the Phelps wood bed.

Two days later her temperature was 104° F. She did not seem to be suffering much, but the wound was dressed, and the dressing was continued daily until April 13, when she was taken from the wood bed, and a plaster-of-Paris bandage applied. Her temperature ranged from 101° to 105° F. from March 6 to May 12. On April 19 she was placed in a wheeled chair, but the discharge from the wounds was very profuse. Some counter-openings had been made, and the drainage was very good. The good position of the limb was maintained all the while by traction.

On May 24 the limbs were equal in length, the discharge was light, and plaster was removed and a long hip-splint applied, the stem being especially long so as to favor abduction. It was noted on June 11 that she had been going around on the splint, but walking very poorly. Sinuses were very nearly healed. The limbs still equal in length. July 19 the wound was healed, she was walking better, complained of some pain on pressure about the hip. The abduction was still maintained by means of the splint. She had improved in health. On July 26 was discharged, wearing the splint with a three-inch high shoe on the sound foot. The measurements were still the same.

September 27 the measurements from the anterior superior spinous processes were exactly the same. From the umbilicus the left limb lacked one-quarter of an inch of being as long as the right. The tip of the trochanter was below Nélaton's line. For the last two or three nights she had complained of much pain, and there was decided fulness to the outer side and above Scarpa's space. An open sinus was found, which led to bare bone. She walked very well; limb was still well abducted. The sinus was tented, bichloride fomentations employed, and two or three days later she was very much improved.

At the time of this examination there was no slipping up or down, and the structures about the hip seemed firm. I propose to leave off the hip-splint in the course of a few weeks after the closure of the sinus.

CASE IV. *Congenital; Hoffa's Operation; Immediate Result Good; Relapse; Readmitted for Further Treatment.*—Male, aged seven and a half, admitted November 10, 1893. Family history good; had had no treatment; began to show the deformity when he first walked. His gait on admission was quite pronounced; favored the left side. There were apparently two inches shortening. Abduction was very markedly limited. Adduction easily made. Extension and flexion good. The trochanter was two inches above Nélaton's line. Head of the femur could be easily recognized on the dorsum ilii. Comparative measurements: From the anterior superior spinous process, right side, 23 inches; left side,  $21\frac{1}{2}$ ; from the umbilicus, right side,  $26\frac{1}{4}$ ; left side,  $25\frac{1}{4}$ ; right thigh,  $11\frac{1}{2}$ ; left thigh, 10; right knee,  $9\frac{1}{2}$ ; left knee,  $8\frac{1}{2}$ ; right calf,  $8\frac{1}{2}$ ; left calf, 8.

The Hoffa operation was performed, November 17, under great difficulty, but the head was finally replaced in the prepared acetabulum. Plaster of Paris was applied with limb in abduction and outward rotation. Wound was left open and packed with gauze.

The wound followed the usual course. There was very little supuration and very little reaction. By January 13 the hip was in good condition, one-half inch real shortening, no practical shortening. Head of bone seemed firmly anchored. Long splint applied, but he was still confined to bed. On January 27 a short plaster-of-Paris spica bandage was applied, and he was allowed up on crutches. On February 23 there was no further shortening, though he had little confidence in walking.

From March 6 to 31 he had diphtheria, and was treated in the Willard Parker Hospital. On his return there was no real shortening, but one-half inch practical shortening,—that is, as measured from the umbilicus. He was to have passive motion every morning, use his crutches, and wear very little support about his hip. The wounds had long since healed.

April 25 it was noted that he was gaining more motion in hip, was walking around with the crutches. On May 23 there was one inch real shortening, one and a half inches practical shortening. He was put to bed, and traction made for a while until an apparatus could

be constructed, which was a combination of the Knight spinal brace and the Thomas hip-splint, with a plain hinge-joint at the hip. July 2 his angle of greatest extension was  $145^{\circ}$ . Considerable adduction. Trochanter was above Nélaton's line.

He was taken home shortly after this, but on tracing the case, October 1, I found that there was three-quarters of an inch real shortening, one and a quarter inches practical shortening. The angle of greatest extension was  $150^{\circ}$ . Very little motion. The tip of the trochanter was one inch above Nélaton's line. The expanded portion of the neck could be felt above the trochanter, and made an examination a little difficult. He walked like one with deformity from old hip-disease.

He was put on inclined plane with weight and pulley, and to-day his deformity is not quite as great, but he still has three-quarters of an inch shortening as measured from the anterior superior spines, and one inch as measured from the umbilicus. There is a small range of motion. It is proposed to make very firm traction on inclined plane, and in this way drag the head of the bone down into position, after which a firm support will be worn for many months. It is difficult to give a prognosis.

CASE V. *Flail-Joint from Acute Arthritis; Exploratory Incision; End of Femur secured to Acetabulum by Kangaroo Tendon; Good Result.*—Male, eight years of age, admitted November 13, 1893. In 1890 he had an abscess about the right hip immediately after an attack of pneumonia. The abscess opened spontaneously, and was treated at the Roosevelt Hospital clinic. On admission his general health was good, but he bore his weight, as he walked, on a dislocated limb. The end of the femur could be seen distinctly forcing upward the gluteal muscles, and as he would bear his weight on the other limb, the deformity would in a measure disappear. The rather sharpened end of the femur could be distinctly felt without any head whatever attached. The comparative measurements: From the anterior superior spinous process, right side,  $18\frac{1}{2}$  inches; left side,  $21\frac{1}{2}$ ; from the umbilicus, right side, 21; left side, 23; right thigh,  $9\frac{1}{2}$ ; left thigh, 11; right knee, 8; left, 9; right calf, 7; left calf, 7.

A posterior incision was made November 28, and extended down upon the end of the femur, which was found devoid of head or neck. Simply the tip of the trochanter presented, covered by some dense fibrous tissues. On seeking for the acetabulum, I found an exostosis

filling the acetabulum, or at least, where this cavity should exist, and with a chisel removed this growth of bone, made a depression triangular in shape. The end of the femur was denuded of periosteum, and a triangular-shaped area made to correspond with that on the ilium. These two surfaces were approximated, one or two strong pieces of kangaroo tendon were passed through holes which were drilled in the two bones, and the parts were securely tied together. The wound was closed without drainage, but additional precautions were taken to pass some steel nails through the femur and ilium until the parts seemed quite firm. A full dressing was applied. Limb put up in plaster of Paris, and primary union took place.

He had no temperature worthy of record, suffered little or no inconvenience, and on January 9, 1894, the steel nails were taken out, the puncture wounds curetted, and simple dressing applied. At this time union was good. On February 2, the plaster of Paris having been continued, there was very slight motion at the hip. The comparative measurements at this time were, right side, 20 inches; left side,  $21\frac{1}{2}$ , as measured from the anterior superior spines; from the umbilicus, right side,  $23\frac{1}{2}$ ; left,  $24\frac{1}{2}$ . There was, thus, less than one inch practical shortening. February 14 the plaster was removed. There was found an arc of motion of  $15^{\circ}$ . At this time a small point at one end of the wound threatened to open, and the kangaroo tendon was found, which was removed, and was in very good condition.

On March 27 a long spring with pelvic band and peroneal strap was applied. He has been walking with this up to the present date, and presents, October 9, the following measurements: From the anterior superior spine, right side,  $20\frac{1}{2}$  inches; left side,  $22\frac{1}{2}$ ; from the umbilicus, right side, 23; left side,  $25\frac{1}{2}$ . He can bear his weight on the limb without the bone slipping up as it did when he was first admitted. Parts seem quite firm, yet I dare not omit the apparatus, and have provided him with a high shoe, one and three-quarters inches, and a jointed splint with hinge-motion at hip.

This case was presented at the Surgical Section of the Academy of Medicine last winter.

CASE VI. *Congenital; Hoffa's Operation; Primary Union; Immediate Result Excellent; Relapse; Failure to maintain Limb in Position by Apparatus; Death from Diphtheria.*—Male, five years of age, admitted October 24, 1892. The history was that he began to show this deformity when he was two years of age, at the time he walked. On admission there were one and a half inches apparent

shortening of the left limb. The head of the bone could be felt. Abduction was resisted. Comparative measurements: Right side, from the anterior superior spine, 19 inches; left side, 18; from the umbilicus, right, 21; left, 20; right thigh, 12; left thigh, 11; right knee,  $8\frac{3}{4}$ ; left knee,  $8\frac{1}{2}$ ; calves same size.

Operation made October 28. Wound closed throughout with catgut.

On November it was noted that he had had one or two days of temperature rather high, but all along had been in good condition. On November 18, plaster of Paris removed. Wound united throughout. Head of femur remains in acetabulum. Limbs of same length. He was put to bed after the reapplication of plaster of Paris. On December 2, plaster of Paris was removed. Limb was found to be a quarter of an inch shorter than its fellow. Motions in all directions were good and painless. On December 14, there was a fair range of voluntary motion. Hip-splint was worn, the shortening at this time having reached one inch, and the head of the bone could be pushed out of the acetabulum with very little force.

From this time forward an attempt was made to hold the head of the bone in place by apparatus, which was partially successful, but on March 1 it still required firm pressure to maintain the position of the head. He developed diphtheria shortly afterwards and died April 17. An autopsy was made by Drs. Townsend and Whitman, fourteen hours after death, at the dead-house of the Willard Parker Hospital. Their report is as follows:

*Autopsy.*—Rigor mortis slightly marked. General condition of the boy fair. Lying on his back, his left leg was markedly rotated outward, limbs parallel. It was evident that the left was the shorter of the two. All movements at hip free. Right anterior,  $19\frac{1}{4}$  inches; left anterior,  $18\frac{5}{8}$ ; right ulna,  $21\frac{1}{2}$ ; left ulna, 21. Trochanter one-half inch above Nélaton's line. A curved incision was made over and above the hip-joint, freely exposing all the parts. The head of the bone was found to be dislocated forward, and the head resting in a socket below the anterior superior spine of the ilium, and held in place by firm adhesions in front, in the line of the original incision at the operation done at hospital. This new facet was about the size of a five-cent piece and was about half-way between the inferior and superior spines. The head of the bone was flattened, the cartilage on its inner edge, where it articulated with the new facet, was eroded, the head was flattened, both laterally and from before

backward. The angle of the neck was depressed, and it made about a right angle. There was no sign of an acetabulum, where the normal acetabulum should be, and the portion that had been scooped out at the time of the operation was filled up with solid tissue which seemed to be partly bone and partly cartilage. With the head attached to the bone at the angle that the neck was found to make, it was clearly evident at the time of the autopsy that any attempt at reduction—that is, complete and perfect reduction into a normal acetabulum—would have been attended by a complete rolling in of the femur, and consequently of the leg, so that a subsequent osteotomy would really have been necessary. The portion of thickened tissue which filled what should have been the acetabular cavity was over one-half inch in thickness. Efforts at traction with the limb in the new acetabulum proved that the rim of the pelvis, which was above it, and on which was located the anterior superior spine, was an effectual bar to the slipping up of the bone in walking, and that although the limb was not in the new acetabulum as expected, for practical purposes the newly-formed joint was more useful than a poorly-formed one on the dorsum of the ilium; that although there was some slight motion upward, it was not equal in any sense of the word to what it was in the old and imperfectly formed acetabulum.

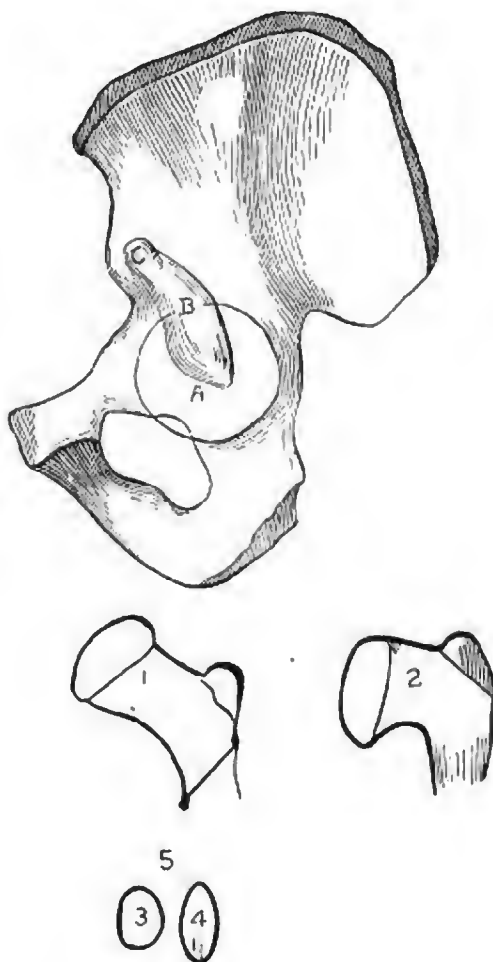
The patient had died from diphtheria and broncho-pneumonia. An intubation had been done some hours before death. In the efforts to remove one of the tubes, it had slipped into the œsophagus and been swallowed, and at the post-mortem the tube was found at the ileo-cæcal valve.

This case was presented to the Orthopædic Section of the Academy of Medicine and has appeared in its Transactions.

CASE VII. *Congenital; an Elder Sister Similarly affected; Lorenz's Operation; the Y Ligament divided; Rather Prolonged Suppuration; Good Result.*—Female, ten years of age, admitted June 8, 1894. Her deformity was noticed at the time she began walking. For three months prior to admission she had had much pain. A sister has been in the hospital on two or three occasions for tubercular osteitis of the knee, and it was only recently that her hips were discovered to be dislocated.

The comparative measurements on admission were: Right side, from the anterior superior spinous process, 23 inches; left side, 21¾. The head of the bone could be distinctly made out.

On June 5 the anterior incision was made, the capsule easily



- (A) Normal acetabulum.
- (B) The elongated, slightly depressed area representing the acetabulum.
- (C) Point with which the eroded surface of the internal aspect of the femur articulated.

The base of the (C. B.) surface to a depth of half an inch filled with cartilage, with here and there a focus of new bone-formation.

- (1) Normal femur.
- (2) Shows shortening and change in angle of neck, flattening and elongation of head as in Fig. 4.
- (3) Normal.
- (4) Eroded area articulating with C.

exposed, a portion of this cut away, and by deep incision with a tenotome the Y ligament was divided. The site of the acetabulum was filled with a small exostosis, which was cut away, a rather deep cavity made, and the head of the bone was easily replaced. She was put on the wood bed with traction.

The suppuration in this case was rather excessive, but there were no complicating abscesses, although counter-openings were made from time to time. On July 9, the measurements were: Right side,  $22\frac{1}{2}$  inches; left side, 22. A splint was applied, on which she has been walking during the latter part of the summer.

Comparative measurements to-day are as follows: Right side, from the anterior superior spinous process,  $22\frac{1}{2}$  inches; left side,  $21\frac{3}{4}$ ; from the umbilicus, right side, 25; left side, 25. The sinuses are about closed. In one there is a raw surface in front, which is generally covered with a scab. She is dressed about once a week. The limb is in excellent position. Tip of the trochanter is below Nélaton's line. Small range of motion.

In her sister's case nothing has been done in the way of treatment for the hip, but for an old deformity of the knee resulting from osteitis, a supracondyloid osteotomy was done about two months ago, with the result of correcting the deformity perfectly.

CASE VIII. *Congenital (?) ; Occurrence of Pain at the Age of Twelve Years ; Great Slipping of the Head of Bone ; an Acetabular Cyst found at Operation ; Partial Excision ; Attempt to Secure Coaptation ; Failure ; a Secondary Operation ; Epilepsy ; Death One Month Later.*—Female, thirteen years of age, admitted August 8, 1890. The history was that at the age of one year, during an attack of whooping-cough, she suddenly became paralyzed in the left leg. Made a good recovery. Walked perfectly when three years of age, so mother avers. The left leg has always been shorter, however, than the right. After exercise, child is easily fatigued. Four weeks before admission, suddenly and without cause, so far as the mother could make out, a severe attack of pain came on, causing her to cry out at night. The hip became quite hot and tender. Was in bed for two weeks prior to admission. We found the trochanter one and a half inches above Nélaton's line, considerable infiltration about the joint, apparent fluctuation over the trochanter, all motions exaggerated, walking painful. A distinct grating could be felt as the head of the bone was moved up and down. Comparative measurements: Right side, from the anterior superior spinous process,  $27\frac{1}{4}$  inches; left

side,  $27\frac{1}{4}$ ; from the umbilicus, right side, 31; left side,  $31\frac{1}{2}$ . These measurements were made with the limb in traction.

A hip-splint was applied, thinking that we could hold the limb in good position. They were the same real length on October 2, without traction. October 30, as she walked, there was apparently two or three inches shortening,—that is, the head of the bone would slip up and down.

January 10, long incision made posteriorly, the tissues divided about the joint, head of the bone found outside of the acetabulum, and on exploring this cavity with my finger I discovered a cyst-like body, which was ruptured, and discharged nearly an ounce of clear serum. The collapsed cyst was removed, the acetabulum denuded, the head of the bone replaced. During the operation she had an epileptic convulsion, and we were forced to complete the procedures as rapidly as possible.

There was a good deal of hæmorrhage at the time of the operation, and two or three days later we had to open the wound on account of the great tension, and there was an escape of blood and serum. March 20, the head of the bone was apparently in the cavity, and the wound was healing. The limb was half an inch shorter than its fellow. May 7, the wound was healed, all motions at hip seemed to be perfect, producing no pain. Still the head could be slipped out of the acetabulum quite easily. The girl was very large and adipose was quite extensive, so that she got excoriations from her apparatus, and she was put in bed with weight and pulley.

August 27, 1891, she was discharged, wearing a brace, which we thought would hold the limb in position.

She was readmitted August 30, 1893. During this interval she had been a source of great annoyance to the Out-Patient Staff. Her epileptic seizures had been rather frequent, and there was found at this date a large fluctuating tumor on the outer aspect of the thigh. This was opened and about four ounces of pus evacuated. By October 9, the discharge had ceased.

November 3, a posterior incision, under ether, over the trochanter, acetabulum curetted again, head of the femur denuded of periosteum, and a portion of the head removed. This was placed in the acetabulum and held by silver wires.

The temperature from this time on ran high, from  $102^{\circ}$  to  $105^{\circ}$  F. Was dressed through fenestrum; pus in great abundance. November 24, wound was doing well. November 28, a series of epileptic convulsions complicated matters, and she died on the 29th.

CASE IX. *Congenital; Typical Age; Dr. Hoffa the Operator; Profuse Suppuration and Septicæmia Following; Result, Great Shortening and Deformity.*—In connection with these cases I desire to put on record a case of Hoffa's operation, done by Dr. Hoffa himself in the operating-room of the Hospital for the Ruptured and Crippled, in the presence of Mr. Howard Marsh, of London, Dr. George Ryan, of Cincinnati, Drs. Ridlon, R. H. Sayre, Ketch, Hubbard, Frank Markoe, Halsted Myers, Whitman, Coley, Townsend, and Milliken.

On September 28, 1891, a girl, two and a half years of age, referred to the hospital by Dr. Berg, of this city. Dr. Hoffa regarded the case as an excellent one for operation. He found distinct shortening and slipping. I am indebted to Dr. C. L. Starr, at that time house surgeon, for the details of the operation. The limb was held flexed at an angle of about  $145^{\circ}$ , while a straight incision was made about three inches long, in the line of the femur, taking the tip of the trochanter major as its centre. This incision was carried through the gluteal muscles in the line of their fibres, until the capsule of the joint was exposed. The edges of the wound were held back with retractors, and a slit made in capsule, in the same line with and of same length as external incision. The ligamentum teres was divided with curved scissors, and the head of the bone was made to protrude through the opening in the capsule. With a gouge and Volkmann's spoon, the upper part of the acetabulum was scraped out and deepened, so as to form a new cavity for the head of the femur. The cavity thus made was about three-quarters of an inch in depth, and extended very nearly through the whole thickness of the bone. The joint was thoroughly flushed with sterilized water, all bone detritus washed out, the head of the bone placed in the newly-formed acetabulum. Prior to this, however, he divided the muscles attached to the trochanter major and minor through this same opening. After replacing the head into the cavity thus made, it was found that the limb could be brought down parallel with its fellow without throwing the head out of the cavity. The wound in the capsule was now closed with catgut suture, the external wound filled with iodoformized gauze, dressing of bichloride gauze applied, plaster-of-Paris spica extending from the ankle to the lower border of the ribs, traction being made while the plaster was applied. The child bore the operation well, was placed in a private room at the hospital, and put in charge of a trained nurse.

Four hours after the operation the temperature was  $104^{\circ}$  F. On September 29, 6.30 in the morning, temperature was  $103.6^{\circ}$ ; had had very little sleep the night previously. The temperature ranged from the 28th to October 1 from  $103^{\circ}$  to  $104^{\circ}$ . By October 3 it fell to  $101.6^{\circ}$ . It went up again to  $103^{\circ}$ , and did not fall until October 6, when it reached  $101^{\circ}$ . From this time it steadily increased up to the 9th, when it reached  $104^{\circ}$ . It did not fall again to  $101^{\circ}$  until October 16. It was the 19th before it reached  $100^{\circ}$ . It ranged from this time until October 29 between  $100^{\circ}$  and  $102^{\circ}$ . On November 5 it was  $101^{\circ}$ , and the patient was discharged.

The wound during this time suppurated, the child had diarrhoea from time to time, and the notes show simple repeated dressings, efforts to keep the limb in good position, and to stimulate the child. The wound did not heal until the middle of December. Dr. Starr attended the case, after it was discharged from the hospital, once or twice a week. Paralysis was noted, which continued for about two months.

Dr. Berg kindly made an examination for me, and reported as follows:

"DEAR DOCTOR: In accordance with your request, I have examined the little Ehrmann baby with both electrical currents. I find the following reactions and objective symptoms:

"*Left leg.* Leg atrophied, patellar reflex exalted (on both sides, and much more so on the left). Deep scar between great trochanter and tuber ischii.

"Faradic current. Good contractility to current of moderate intensity in glutæus maximus and medius and quadriceps extensor. No reaction to exceedingly painful currents in biceps and semitendinosus, semimembranosus, anterior tibial group, posterior tibial group, and peronei. No reaction in nerves at the motor points.

"Galvanic current, twelve cells. Normal reactions in quality, excessive in quantity, in glutæi and quadriceps extensor. Absolutely no reaction in flexors of the leg (biceps, etc.), adductor magnus, anterior and posterior and tibial groups, except slight reaction in gastrocnemius and soleus; with reversal of formula, there being a slight, slow contraction of the opening of the anode, and none at opening of cathode, as shown by a movement at the tendo Achillis, so that the paralysis is limited to the region and muscles supplied by the branches of the sciatic nerve.

"Very sincerely yours,

"H. W. BERG, M.D."

During this period also a hip-splint was kept applied. On February 29, 1892, I made a note that the child was walking very well on the splint, limbs were about equal in length, possibly one-quarter of an inch shortening. Child was able to raise the leg from the table

and move the toes a little. Limb is developing, the paralysis is disappearing. Is having no treatment other than the apparatus. April 11, 1892. "Still wearing the brace, though the paralysis seems to have disappeared. Child can move the toes, and can raise the limb up from the table very easily. There is limited motion at hip, at knee, and at ankle. Right anterior,  $14\frac{3}{4}$  inches; left anterior,  $14\frac{1}{2}$ ; right umbilicus,  $16\frac{1}{2}$ ; left umbilicus,  $15\frac{3}{4}$ ; right thigh, 4 inches down, 10; left thigh, 4 inches down,  $9\frac{1}{4}$ ; right calf,  $6\frac{1}{2}$ ; left calf,  $5\frac{3}{4}$ . General condition fair. The trochanter comes under Nélaton's line. It seems to be farther forward than the trochanter on the right side. Apparatus to be left off for three or four days." From this time the patient was kept under observation in the Out-Patient Department, and on November 11 I made the following note: "About two or three weeks ago the child was put under ether, and the adduction overcome by manual force. The joint functions were pretty fair, barring this resistance on the part of the adductors. Limb was put up in abduction. This morning the plaster was removed, and the abductors still a little tense, but this was thought to be due to fear. There is from a half to three-quarters of an inch practical and real shortening." On January 26, 1893, measurements as follows: "Right anterior,  $16\frac{1}{4}$  inches; left anterior,  $15\frac{1}{2}$ ; right umbilicus,  $18\frac{1}{2}$ ; left umbilicus,  $17\frac{1}{4}$ . Tendo Achillis is shortened some, and the foot is in moderate valgus. She can flex to  $90^\circ$ , and extend to about  $175^\circ$ . The adductors are quite tense, and resist abduction. A jointed splint is to be applied with a pad over the trochanter." This was finally applied, and to-day, April 21, I examine her and find one inch shortening. The trochanter is above Nélaton's line. There is a moderate degree of adduction.

This case has been presented to the Orthopædic Section of the Academy, and has appeared in the Transactions.

A careful study of the cases presented in this paper, in connection with a paper published by Dr. Bradford,<sup>1</sup> leads one to be very circumspect in his advice about the propriety of operative procedures.

I am convinced that the failure on my own part to get perfect results has been due largely to the faulty technique in operation. There was a leakage somewhere in every case, and sup-

<sup>1</sup> ANNALS OF SURGERY for August, 1894.

putation followed, in the majority of cases, most profusely. We had, therefore, to combat for many weeks and months a violent arthritis. During this period we ought to have been moving the joint about, and the wound should have been healed. The cases I have taken were beyond the age limit, and I hesitate to present them for that reason, because I am convinced that the operation, in properly-selected cases, is justifiable, and even is demanded in many instances. The operation proposed by Dr. Bradford, which is a modification of Lorenz's, I believe will give better results than that proposed by Hoffa,—that is, in patients beyond four or five years of age. Hoffa's operation for young children is a good one, and I am sure that good results have been obtained, because I have seen many of his cases, and from personal knowledge know that his results are better than the results we have obtained in the more advanced ages. Hoffa himself has experienced much difficulty in managing these older patients. With the division of the Y ligament, and a perfectly aseptic operation, the results ought to be very good, and I am not at all disposed to abandon the procedures for relief. Dr. Bradford seems to have had the same difficulty. He reports, for instance,<sup>1</sup> five operations according to Hoffa's method, and I quote the following:

“A. F., three years old; double deformity; two operations.

“A. W., three years old; single deformity; one operation.

“M. C., three years old; single deformity; one operation.

“M. (col.), three years old; double deformity; two operations.

“H. K., eight years old; double deformity; one operation.

“The result in these cases can hardly be considered satisfactory. In all except the last the wound healed up thoroughly and well. In the last the wound, a week after the operation, was progressing favorably, but the child was seized with diphtheria, and died three weeks later with diphtheria and sepsis of the wound. . . . In the case of M., colored, the first operation healed readily, but a week after the second operation the patient was taken with scarlet fever and died.

“In the case of A. W., the wound healed, but the child died with symptoms of diarrhœa and vomiting, a month after operation,

<sup>1</sup> ANNALS OF SURGERY, Vol. xx, p. 133.

apparently without any connection with the operation, the wound having entirely healed.

"In the surviving cases, A. F. and M. C., the patients recovered well from the operations (double in the first, and single in the second case). It did not appear, however, that the head of the femur was well fixed in the new acetabulum in either of the cases, or that patient had been materially benefited by the operation.

"The three deaths can hardly be attributed fairly to the operation, the last two occurring at a time when the hospital was visited by an epidemic of contagious disease. It is probable, however, that the operation may have diminished the patient's power of resistance in both these cases, as in the third case."

It is only fair to say that in my own cases the operations were done at a time when sepsis was apparently contagious in this city. To my personal knowledge, in two or three of the large hospitals where all details were regarded as faultless, sepsis did occur after the most carefully-conducted operations.

The conclusions drawn from the data given in this paper are likely, therefore, to be misleading. As mentioned in the early part of the paper, these histories were presented as a study, and I think a careful perusal of the same will enable us to more judiciously select operative cases, and to do less violence to the parts and watch closely all chances for defects in antisepsis.

Dr. T. Halsted Myers<sup>1</sup> has presented a very complete *résumé* of the various operative procedures, as well as the mechanical procedures for the reduction of congenital dislocation of the hip. His conclusions are as follows:

"The number of perfect cures is very small.

The number of cases improved is large.

The results in double dislocations are not so favorable as in single.

The lordosis is generally corrected.

A slight spinal curvature generally persists, owing to the atrophy of limb and pelvis.

The limp persists to some degree almost always, though if the

<sup>1</sup> ANNALS OF SURGERY, August, 1894.

posterior dislocation is relieved, a high shoe will correct this limp almost if not quite perfectly."

The conclusions that may be drawn from the traumatic cases, I think, justify one in advocating arthrotomy without hesitation.

In the following tables, the terms under "result" are sufficiently explanatory, with the exception of the term "good." By this is meant a useful limb, but not a perfect limb. Generally the joint is ankylosed. "Very good" and "perfect," of course, explain themselves.

I have added some cases taken from a very interesting paper by Dr. M. L. Harris,<sup>1</sup> of Chicago, Professor of Surgery in the Chicago Policlinic. The title of his paper is "The Operative Treatment of Old, Unreduced, and Irreducible Dislocations of the Hip." I have selected from his reports such cases as related to the childhood period, and, without including the references in the tables, will simply state in this connection that No. 10,<sup>2</sup> No. 11,<sup>3</sup> No. 12,<sup>4</sup> No. 13,<sup>5</sup> No. 14,<sup>6</sup> No. 15,<sup>7</sup> are references.

<sup>1</sup> ANNALS OF SURGERY, September, 1894.

<sup>2</sup> ANNALS OF SURGERY, May, 1893, p. 586.

<sup>3</sup> Deutsche Zeitsch. f. Chir., Bd. xxxvii, p. 373.

<sup>4</sup> Deutsche med. Wochensch., August 10, 1893, p. 761.

<sup>5</sup> London Lancet, January 23, 1892, p. 194.

<sup>6</sup> London Lancet, November 1, 1884.

<sup>7</sup> London Lancet, November 15, 1884.

TABLE I.—CONGENITAL DISLOCATIONS.

Case.	Sex.	Age.	Operator.	Date of Injury.	Date of Operation.	Condition of Wound.	Date of Last Observation.	Result.	Remarks.
3	Female.	9	Personal.	Congenital.	Mar. 6, '94.	Oct. 6, '94, a sinus.	Sept. 27, '94.	Good.	Prolonged suppuration.
4	Male.	7½	Personal.	Congenital.	Nov. 17, '93.	Jan. 27, '94, closed.	Oct. 1, '94.	Relapse; not good.	Suppuration not great, but very difficult to maintain good position; relapse; readmission; diphtheria complicating.
6	Male.	5	Personal.	Congenital.	Oct. 28, '92.	Dec. 2, '92, closed.	Mar. 1, '93.	Relapse.	Died of diphtheria, April 17, 1893.
7	Female.	10	Personal.	Congenital.	June 15, '94.	Oct. 10, '94, a sinus (?)	Oct. 10, '94.	Good.	Much suppuration; a sister has same deformity.
8	Female.	13	Personal.	Congenital (?)	Jan. 10, '91.	June 25, '91, closed.	Nov. 24, '93.	Bad; relapse.	An epileptic; a cyst filling acetabulum producing the deformity; two operations; death from septicæmia and epilepsy.
9	Female.	2½	Hoffa.	Congenital.	Sept. 28, '91.	Dec. 15, '91, closed.	Jan. 26, '93.	Relapse and ankylosis.	Dr. Hoffa, of Würzburg, operated himself; after treatment in Hospital for Ruptured and Crippled.

TABLE II.—TRAUMATIC DISLOCATIONS.

Case.	Sex.	Age.	Operator.	Date of Injury.	Date of Operation.	Condition of Wound.	Date of Last Observation.	Result.	Remarks.
1	Male.	8	Personal.	Nov. '92.	May 19, '93, a secondary one.	Oct. 6, '93, healed.	Oct. 10, '94	Very good; no shortening.	A secondary operation; the first at Mt. Sinai; relapse; suppurative extreme; paralysis not fully recovered from.
2	Male.	8	Personal.	Nov. '93.	Apr. 18, '94.	Sept. 27, '94, about closed, one small sinus	Sept. 10, '94.	Good; limbs equal in length.	A traumatic case; much suppuration.
5	Male.	8	Personal.	In 1890.	Nov. 28, '93.	Mar. 27, '94, closed.	Oct. 10, '94.	Good.	A flail hip; bones wired.
10	Male.	8	Gerster.	Nov. '92.	Dec. 20, '92.	3 weeks later, healed.	Mar. 8, '92.	Relapse.	The same as Case 1 of this table.
11	Male.	9	Klister.	Traumatic.	Sept. 23, '92.	Oct. 13, '92, healed.	Aug 5, '93.	Perfect.	Relapsed at the end of three weeks; easily reduced; traction; splint for month.
12	Female.	4	Helferich.	May 5, '91.	May 18, '91.	June 1, '91, healed.	May, '93.	Perfect.	Acetabulum clear at time of operation; an arthrotomy only necessary.
13	Male.	11	Hughes.	Sept. 20, '90.	Dec. 5, '90.	Jan. 20, '91, healed.	July, '91.	Failure to reduce; two in. shortening.	"Cause of the irreducibility was never determined."
14	Male.	11	Wm. Adams.	During rheumatism. Date(?)	Mar. 29, '82.	June 1, '82, healed.	Oct. 1, '82.	Good.	Excision, followed by sup- puration.
15	Male.	11	Sidney Jones.	May, '79.	Nov. 25, '79.	(?)	5 years later.	Good.	Excision.